# I N F O R M A T I O N

AND

# O P E R A T I N G  I N S T R U C T I O N S

CONCERNING THE

# B A L C A R

AND

CALUMET/ELLIPTICA

ELECTRONIC FLASH

MODEL T-1005A (F101)

1200 WATT-SECONDS (JOULES)

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# P R E F A C E

This booklet on our Electronic Flash Units started off as a simple instruction booklet ten years ago. And when I decided to rewrite it, I decided to bring it up-to-date and at the same time add a bit more materiel to it. Then, bit by bit, I thought it best to try and answer any questions you and any other photographers might ask. Realising that many photographers might wish to read this booklet over before buying any equipment, I decided to explain things in this booklet as if I were talking personally to them, giving them information to guide them.

During the past few years, many of my importers have asked me to come to their countries to give lecture-demonstrations to their top professional photographers, and many of the things I've discussed in my lectures on "The Principles of Lighting" are dealt with here.

Because of the limited space, what is said in this booklet is necessarily limited. But I sincerely hope it will nevertheless be helpful.

Paris, France, 18 June 1968

M. Ballis

## THE FLASH UNIT

You will notice first of all, its light-weight, small size, and simple, practical presentation.

You can carry it easily, store many units in the trunk of your car, and use it in any position and on any voltage (110/240 V. 50/60 Hz).

All elements are easily demountable and take up a minimum of space.

It has been designed to be taken with you anywhere you wish. Its circuitry is as foolproof as can be, and 3 printed circuit boards and top-notch workmanship assure you years of use with a minimum of trouble.

It charges in about 2 seconds ! And constant light output is guaranted.

The BALCAR/ELLIPTICA Flash unit is simple to operate. In fact, let's say that we have purposely simplified it, to make it easier for you and your assistants to use without worry. All "useless" hardware has purposely been eliminated.

Certainly no other high-powered electronic flash unit is used in so many studios, in so many countries to do so many different types of photography.

To some of you, a number of things about the flash unit may seem unconventional and strange. However, to others, you will already be used to the original thinking in the BALCAR/ELLIPTICA Flash Unit. It is interesting to know that BALCAR S.A. in Paris, France was the first company to incorporate the following features in its professional flash units :

1) A built-in 10ft (3m) extra lightweight monopod
2) To use a bounce, white umbrella,
3) To design a special reflector system for use with umbrellas and to incorporate a mechanical system for holding the umbrella,
4) To charge 1200 J. (w/s) in less than 3 seconds, with a lightweight easily transportable flash unit, WITHOUT ANY DANGER of OVERHEATING,
5) To have a THYRATRON-CONTROLLED VOLTAGE STABILISATION SYSTEM,
6) To give you 1/4 or 1/2 power at the flip of a switch,
7) To use TRANSLUCENT UMBRELLA DIFFUSERS for variable difusion with ALL reflectors,
8) To invent the fantastic SP-5 ELLIPTICA SPOT-PROJECTOR,
9) To make a giant, extremely efficient 1m Ø reflector system with,
10) To offer a complete line of interchangeable reflectors for every type of angle or for many different types of lighting.

Before using your flash unit, may we suggest your reading over what is written here. It may avoid a few costly mistakes. And it may also help you in getting "just the right lighting effect" you wish.

# THE CALUMET/ELLIPTICA F101 AND BALCAR ELECTRONIC FLASH MODEL T-1005A

## ASSEMBLING THE FLASH UNIT

1° Attach the 3m (10 ft.) telescopic monopode to the generator.

2° Screw the lighthead tightly on the monopode.

3° Remove the metal tube protector (PL-2) by unscrewing slightly and squeezing together the two black knobs.

4° Plug in the Quartz flash tube (FQ-2500), then screw in the 4 rare gas, high efficiency modelling lamps (40 watts small screw Edison E-14).

5° Plug the lighthead into one of the plugs on the generator making sure that the blue rectangles face each other. Be sure that the plug is pushed in completely. The synchro pin of the plug is filed down shorter than the others, to avoid the flash from going off when plugging in the lighthead.

6° The flash unit will operate correctly in any position.

## OPERATING INSTRUCTIONS

1° The unit will work on 90/140 V. or 180/280 V. 50/60 cycle current only with a CONSTANT LIGHT OUTPUT and COMPLETE PORTECTION against voltage variations assured by a built-in thyratron-controlled voltage stabilizer.

The switch marked FLASH turns ON or OFF the FLASH GENERATOR as well as the MODELLING LAMPS if their switch is ON.

The switch marked MODEL turns ON or OFF the MODELLING LAMPS only.

VOLTAGE SELECTOR :

1) Select the voltage desired by screwing in the small black knobs (on the control panel) next to the number corresponding to your line voltage, for both the FLASH and MODEL switches.

NOTA CONCERNING MODELLING LAMPS : The Flash Unit is delivered with 4 40 W. 120 V. high efficiency, rare gas modelling lamps which are used in parallel on 120 V. and in series (with the transformer) when on 240 V. (While it is possible to screw in the 75 W. frosted glass modelling lamps especially made for the SP-5 Spot-Projector, this is not recommended since 4 x 75 W. = 300 watts which will cause too much heat).

2) When the axis of the toggle switches are next to the RED squares, the switches are OFF. They are ON when they are next to the GREEN squares.

3) Switch the CHARGING TIME CONTROL to either RAPID charge (about 2 seconds) or to SLOW charging time (maximum 8 seconds). It is necessary to use the slow charging time when using :

a) Several flashes on a weak electrical line or with the MOTOR-GENERATOR.
b) When reforming the flash condensors (see MAINTENANCE).

NORMALLY THE 3 SECOND CHARGING TIME SHOULD BE USED.

4) Insert the 25 ft. (7,50m) special AC POWER cord (which is provided) into the receptacle marked AC 50/60 and plug the other end into the corresponding AC line.

5) Switch on the FLASH GENERATOR. When the neon indicator is lit, the unit is charged to at least 80 %, and ready for use.
6) Switch on the modelling lights and check that the four bulbs are lit.
7) Push the square OPEN-FLASH pushbutton to see if the flash goes off.

## CURRENT CONSUMED AND FUSE CHARACTERISTICS

Due to special current limiting circuits the new T-1005A (F101) flash unit draws very little surge current compared to other flashes of the same power being charged in 2 to 3 seconds. Therefore, only a "slo-blo" fuse of 8 Amp. (5x20mm or American type) is used on 110 V. and only 4 Amp. on 220 V. Once charged, the generator draws practically no current except for 1.5 Amp. for the modelling lamps (110 V.) and less than 1 Amp. on 220 V.
On slow charge, about one third the current is used.

## GROUND (EARTH)

Certain flashes are supplied with a 3-Pole earthed plug. If supplied with the 2-Pole unearthed plug, it is advisable to ground the flash unit by screwing a ground wire under the black knob marked ( ).
The lightheads may be grounded to the generator case, simply by taking each lighthead and screwing in a screw in the hole especially put there for this purpose.

## SYNCHRONIZATION

1) We strongly recommend using the 14" (35cm) synchro cord made by BALCAR ALONG WITH THE SPECIAL 25 ft. (7,50m) polarized synchro extension cord. However, you can make your own by putting a standard European plug (Ø 4mm and separation width : 19mm), or a standard U.S.A. 110 V. plug, on the end of the synchronizing cord coming from your shutter. The shielded (ground) wire must go to the side of the "Sync. X" plug (on the generator) marked with a YELLOW DOT. If this polarity is not respected or if your wire is of poor quality, your unit may not go off properly.

2) Check your synchronizer cord by flashing off several flashes with your shutter on "X" or "STROBE".

## SYNCHRONIZING OF SEVERAL T-1005A UNITS TOGETHER

Normally synchronization of several T-1005A flashes is done by the built-in phototube thyratron tripping circuit. This is the simplest and quickest way, as no wires between units are needed.

However, it may happen that tripping by the phototubes is either impossible or not desirable. In this case, close the mirror-flap over the phototube and link together all the "Sync. X" circuits IN PARALLEL adding the units ONE BY ONE (using our male/male adaptor and our special 7,5m (25 ft.) extension cords) with a colored point on each plug indicating the polarity. IT IS ABSOLUTELY NECESSARY TO RESPECT THE POLARITY (color on color). If this polarity is not respected, or if the AC Power cords are not plugged-in in parallel, the units may flash by themselves or refuse to go off. The thyratron triggering circuit permits any number of flash units to be set off at the same time without danger to the contacts in your shutter. Depending on the way the AC cord is plugged in (its polarity) and on whether or not you have respected the polarity of the ground side of your synchro plug, a slight tingling effect may be

felt. This is normal and without danger. By respecting the ground side of your synchro-plug, this will not happen.

When using the flashes on 230 Volts with the synchro wires in parallel, self-triggering of the flashes may occur. This can be remedied by turning the AC plug around.

The phototube tripping circuit and the "Sync. X" circuit, are completely separated from each other. A unit set off by its phototube tripping circuit is incapable of setting off other units by means of their "Sync. X" circuits. All units being set off by their "Sync. X" circuits must be set off by plugging all these circuits together in parallel, and by short-circuiting them with your shutter contacts, or with a remote control photo cell.

IMPORTANT : Never wire together the trigger circuits of different makes or models of electronic flashes.

## PHOTOTUBE TRIPPING

To set off the unit automatically by another flash, in a studio it suffices usually to open to a 90° angle the mirror-flap over the phototube. However, outside a studio it is necessary to make sure that the phototube "sees" the light from the unit being used to set it off. To do this, open the mirror-flap to 90° ; turn the mirror in the direction of the command flash, and then pivot the mirror-flap up and down until the light from the modelling lights of the unit being used to set off the other is reflected by the mirror-flap down onto the phototube.

Thus the angle of the mirror-flap will vary, depending on how high and how far one unit is in relation to the other.

If phototube tripping is not desired, simply close the mirror-flap.

More sensitivity is obtained by preventing a high degree of ambiant light from falling on the phototube.

REMOTE CONTROL PHOTO-ELECTRIC CELL "SLAVE UNIT". This "Slave Unit" plugs into any 25 ft. polarized synchro extension cord going to the Synchro "X" plug on the Flash Generator. By using our Male/Male synchro adaptor, the synchro circuits of several T-1005A Flash Units can be put in parallel and triggered by the "Slave Unit". There is an increase of sensitivity when 2 or more flashes are wired together.

It is often most useful to have this remote control photocell, since the built-in photocell in the flash unit may be hidden. Also, it should be remembered that contrary to the Remote Photocell, the built-in photocell cannot trigger other flashes even when their synchro circuits are linked together in parallel.

## POWER SELECTOR

Flip the power selector switch to 1200 J. or 600 J. or 300 J. (center position), depending on which power you wish. (ONE JOULE = ONE WATT-SECOND). But do this only when the flash unit is 100 % charged or after turning it off and waiting 1 minute. While the special TUNGSTEN contacts do not risk being melted together due to a false movement, they can become stuck together if the selector is switched prematurely.

## USING SEVERAL LIGHTHEADS ON ONE UNIT

It is possible to vary the power per lighthead from 75 Joules (W/S) to 1200 Joules (W/S) by using one to four lightheads per unit and putting the unit on either full or 1/2 or 1/4 power.

However, as the power discharged per head becomes less, so does the flash duration (see chapter "High Speed Photography" page 9 ).

When extra lightheads are used on the same generator, less power will be had with the one having the longer cable. Normally only one or two lightheads are used per unit. For further information, read over the chapter on "Extra lightheads on Electronic flash units".

## POWER DISCHARGED

| | 1200 J pos. | 600 J pos. | 300 J pos. |
|---|---|---|---|
| 1 Lighthead | 1200 J. | 600 J. | 300 J. |
| 2 Lightheads | 600 J. | 300 J. | 150 J. |
| 3 Lightheads | 400 J. | 200 J. | 100 J. |
| 4 Lightheads | 300 J. | 150 J. | 75 J. |

## 4800 J. (W/S) MULTITUBE LIGHTHEAD

This special lighthead contains 4 flashtubes and plugs into 4 T-1005A (F101) and gives exactly 4 times the amount of light of one 1200 Joules lighthead, with the same flash duration (sse page 9 ).

All the T-1005A standard reflectors can be used with this special lighthead. However, it has no modelling-lamps. It is easiest to put the reflector on first, and then plug in the flash tubes. You may also discharge for example, 2400 J. in the MULTITUBE Head and 600 J. in each of your regular lightheads, with 4 flashes.

It can also be used on one flash unit to obtain very short duration flash pictures (see chapter HIGH SPEED PHOTOGRAPHY, page 9 ), or with four flash generators for doing stroboscopic shots with one lighthead (see chapter STROBOSCOPIC SHOTS, page 11 ).

## HIGH SPEED PHOTOGRAPHY

Your ELLIPTICA T-1005A (F101) Flash Unit can be used to take VERY SHORT DURATION FLASH pictures.

However, before explaining exactly what to do, it is best to understand the principles involved.

If you wished to empty a tank of water, you could of course, empty it in 1/4 the time by using four plastic tubes instead of one, and if the tank were only 1/4 full, it would also be emptied in about 1/4 the time. And were it 1/4 full and 4 tubes used, you could empty it in about 1/16th the time.

Now this analogy is completely valid with electronic flash. The amount of water in the tank corresponds to the power in Joules you wish to discharge, and the number of flash tubes in parallel, discharging this quantity of Joules, corresponds to the number of tubes being used to empty the water tank.

So, it is obvious that the shortest flash duration will be obtained by putting your flash unit on 1/4 power and then discharging this power through four flash tubes at the same time.

IT IS FOR THIS SPECIFIC PURPOSE THAT THERE ARE FOUR LIGHTHEAD PLUGS ON YOUR FLASH UNIT.

The same flash duration is obtained by using four seperate lightheads or by using the multitube lighthead (containing 4 tubes).

| Power discharged in each tube. | Useful flash duration. |
|---|---|
| 1200 Joules | 1/666 sec. |
| 600 Joules | 1/1350 sec. |
| 300 Joules | 1/1700 sec. |
| 150 Joules | 1/3000 sec. |
| 75 Joules | 1/5000 sec. |

Other factors such as cable length also effect flash duration. The longer the cable, the longer the flash duration. Also a cable lying in a straight line will give a shorter flash duration than one coiled-up in the same manner as a long, coiled-up plastic tube lets through less water per minute than a short, straight, big diameter tube. The mathematical formula for flash duration is : $T = RC/1,000,000$ where R = the average resistance of the flash tube during ionization and C = the capacity in Microfarads being discharged.

It is erroneous to think that by using a smaller capacity at a higher voltage, you will always have a shorter flash duration, since flash tubes for higher voltage always are longer in length, usually helicoidal in form and thinner in diameter. All these factors increase R. Their internal resistance is often about 8 to 15 ohms, while the newtype flash tubes used on your BALCAR/ELLIPTICA flash unit have internal resistances as low as 1/10th of an ohm. The efficiency of these new tubes are much higher than those previously made.

For special purposes needing even shorter flash duration than that available with the T-1005A, BALCAR S.A./PARIS make special low-energy electronic flashes with flash durations as short as 1/100,000 sec. (10 micro-seconds).

It is important to remember that two other factors control to a great extent the effective photographic duration of your flash : 1) the reflecting power of the subject. 2) the latitude of the emulsion you use.

The more light the subject reflects, the longer the effective flash duration will be, since a greater portion of the whole flash curve will be used before your film is underexposed.

In much the same manner, a very contrasty film having little exposure latitude, will give a shorter effective flash duration, since underexposure is encountered much more quickly than with a film with long latitude.

This apparently contradictory effect, can be seen by photographying a rotating object having both shiny and black markings on it. All the shiny parts will be blurred, while the black markings will be sharp, even though they are both revolving at the same speed.

There can be a few micro-seconds difference in the triggering of different flash units, so in order to avoid the risk of having a multiple image stroboscopic effect, always use just ONE Flash generator.

If just one light source is needed, use the MULTITUBE LIGHTHEAD. Even shorter flash durations with this head are possible by cutting the 5m (15ft) lenght of the cables down to 1m (3ft).

Always, put your shutter on its most rapid speed (1/500 sec.) to avoid any blur caused by the tail portion of the curve or by that of any ambiant light. (Your shutter speed has absolutely no effect on the exposure).

If you do not have enough light with the R-50 reflectors, use the R-25 to regain the light power necessary.

## STROBOSCOPIC SHOTS

Certain types of STROBOSCOPIC SHOTS can easily be very well made with the BALCAR/ELLIPTICA 1200 J flash units.

Remember that for all Stroboscopic shots, your shutter must be left open for the whole time it takes for the movement you are photographying. Therefore, to avoid overexposing the background or to avoid it appearing "through" the subject that you are photographying, it is necessary for you to use a BLACK background. If photographying something outdoors, do it at night.

Since only the electronic flash will be used to "stop" the movement of the subject, it is preferable to avoid a very WHITE subject and in order to have a very short flash duration, it is best to use your flash unit on 1/4 or 1/2 power.

By using your flash units on 300 Joules, each unit charges in about 2/3 second, so with your flashes, you'll be able to flash off up to about 5 flashes of 300 J per second almost indefinitely. This suffices for most purposes.

By placing colored filters or cellophane over each reflector, you can break up the movement into different colors. If your subject is moving laterally, you may wish to line the different lights up in a row, (using the R-50 reflectors), so that you will evenly light the subject.

You should try to space your flashes so that the movement overlaps only slightly.

When doing B + W shots, it is best to try to avoid the flat lighting so often used with color stroboscopic shots , and preferably use two lightheads per flash. One lighthead should be used as a backlight from the right and another from the left, directly in line with the movement of the subject. This lighting arrangement gives better depth to the photo and throws relatively little light into the part of the subject parallel with your camera lens. Thus, if the images overlap, there is only a small area of your photo with a multiple mix-up of images.

We supply three different kinds of synchronizing systems for use in making STROBO-SHOTS :

1° A simple 4 contact keyboard panel,

2° A manual-driven rotating contactor for use with up to 8 flashes,

3° An electric motor-driven control box (with variable speed) for up to 12 flashes. An intercoupling system permits you to change the sequence of firing as wished.

NOTA :

All photographers contemplating buying extra lightheads for their Electronic Flash Units should read the following information which is true for all types of Electronic Flash Units being presently manufactured, not just for BALCAR/ELLIPTICA flashes. Any flash manufacturer not drawing the photographers' attention to the drawbacks of using several lightheads on one flash generator is guilty of grossly misleading his clients. Only the new ELLIPTICA P-6 portrait flash unit avoids 100 % all of these disadvantages.

## EXTRA LIGHTHEADS ON ELECTRONIC FLASH UNITS

### ADVANTAGES

The main advantage of buying extra lightheads is that of increasing the number of light sources for a relatively small extra expense.

Also in special cases, such as Portrait Photography, the photographer may place his lights close to his subject thus having much more light available. In which case, individual flash generators per lighthead would give too much light output, obliging the photographer to use with color film, an f-stop smaller than f-22 (which is not always desirable). Of course, less light is needed than in Commercial Photography.

For Portrait Photographers, a standard flash equipment usually consists of 2 complete T-1005A 1200 w/s flash units equipped with 2 extra lightheads with 5m (15ft) extension cables and various accessories.

Photographers often think that by using extra lightheads, they will have less weight and bulk to carry around for location work. However, this really shows itself not to be true, since extra tripods, cables, etc... must be taken in place of an extra flash unit. It must not be forgotten that today's T-1005A (F101) flash unit weighs far less than previously.

### DISADVANTAGES

A poor financial investment, since you'll be spending more money to have less than half the light ouput per lighthead.

Insufficent light ouput for many jobs where : 1) big areas must be lit, 2) very small f-stops must be used, 3)"bounce" light is necessary.

Risk of poor color quality due to Reciprocity Failure caused by too short duration. Flash duration is almost inversely proportional with the number of lightheads used per flash generator. (Varying the power output of the flash unit by switching the power selector to a lower joule rating does not change the flash duration in the same manner as that done by adding extra lightheads. And since the discharge curve is different, little reciprocity failure is encountered by varying the power selector).

Loss of total light output, the extent of which can be seen by taking an exposure reading with an electronic flash exposure meter. You will find for example, that with one lighthead on the unit, f-8 is obtained. When two lightheads are put on the flash unit, the lighthead with the normal 10 ft. (3m) cable will give the expected reading of f-5.6, but the other lighthead at the end of the 30 ft. (10m) extension cable, will give a reading of only f-4 (1/2 the other and only 1/4 that of one lighthead

alone !). This can cause problems in balancing light and depending on the whether the cable is wound up or not, the amount of light will vary.

In most cases, 25 % of the total light ouput is lost somewhere. Why is there such a difference when extra lightheads are used ? First of all, a certain amount of energy is lost in the extension cable (about 1 % per meter 3 ft.). Secondly, there is a difference of impedence (resistance) between the extra lighthead at the end of the 30 ft. (10m) cable and the other lighthead plugged directly into the flash unit. Therefore, the larter (with a lower impedence) draws more of the available energy than the other. The flash tubes used on the ELLIPTICA flash units are calculated to give their maximum efficiency at their nominal light ouput (1200 J.), and when less energy is discharged through them, their efficiency drops. So in the above cited case, since significantly less energy goes to one lighthead, less of this energy is converted into light. (However, when using your flash unit on 1/4 or 1/2 power, special compensating circuits, keep the light output proportional).

Problems with triggering the flash tubes may eventually occur, especially so if a new flash tube is used with a worn-out one, since the new tube - much easier to trigger - goes off before the older one has a chance to go off. Often old flash tubes will work by themselves, perfectly,but cannot compete with new flash tubes on the same flash generator. All triggering problems are increased as the number of flash tubes per flash unit are increased. Remember too, that the more flash tubes discharged, the more the trigger tube will be "tired out" and eventually it will need replacing since its voltage drop increases, thus weakening the trigger impulse. NO trouble is experienced with two heads per flash unit, but with 3 or 4, problems are encountered unless new flash tubes and new trigger tubes are used.

Breakdowns can occur with any flash unit, and it is, therefore to your advantage not "to have all your eggs in one basket" and much preferable to have several flash generators since you can thus continue working, even if one flash generator should breakdown, simply by plugging your lighthead into another flash generator.

Considerably more difficulty is often involved in installing extra lightheads, since : the distance they can be placed away from the flash generator is limited ; bulky tripods must be used taking up more space than a flash generator with its monopod ; and heavy cables must be used to link the lightheads to the generators, rather than just plugging individual T-1005A flash units into nearby AC plugs.

## Our recommendations

In view of what has been said above, and in view of our experience in manufacturing and selling over 10,000 1,200 J. flash units, we recommend the following to all photographers requiring 2400 J. (w/s) or more, doing to a great extent commercial photography :

1) When buying electronic flash equipment, buy complete T-1005A flash units for each light source needed, unless you are a Portrait Photographer doing only Portrait work, in which case equip yourself with a P-6 flash unit or with 2 T-1005A flashes with 2 extra heads.

2) Extra lightheads can be bought to serve occasionally as extra light sources, but should not be bought to serve for this purpose every time, unless you are working with a small format camera and do not wish to use a very small f-stop.

3) Whenever using the SP-5 Spot-Projector, it should be used alone on one T-1005A flash generator or even with our special 2400 J. flash units.

4) Better color quality is obtained by using the power seleotor rather than by lessening the power per head by adding extra lightheads.

5) Quicker charging time is had by using less power per generator with one head.

6) Only if you can't afford to spend more, should you decide to buy extra heads. You'll be happier with individual flash units.

## WHY DO BALCAR/ELLIPTICA FLASH UNITS HAVE 4 LIGHTHEAD PLUGS ON THEM SINCE WE DO NOT RECOMMEND THEIR USE ?

Originally all of our flashes were manufactured with 2 lighthead plugs. However, several years ago, when we came out with the multitube lighthead (4 tubes - 4.800 J. lighthead) we decided to add on two extra plugs thus giving photographers the possibility to make special very short duration flash pictures for special purposes, simply by plugging the multitube flash head or 4 seperate lightheads into the same flash unit. By placing the power selector on 300 J., even shorter duration photos can be taken than with the power selector on 1,200 J. (see chapter on "High speed photography" page 9 ).

## WHAT TO DO WHEN THE UNIT DOESN'T WORK CORRECTLY

IF THE NEON INDICATOR DOESN'T LIGHT UP, CHECK THAT :

1) The AC current (110 or 220 V.) is feeding correctly into the flash unit. Do this by turning on both the MODEL and FLASH switches. The modelling lamps should then be lit.

2) If not, then check that the fuse is not blown or that the top of the fuse holder is not loose.

3) Is the voltage selector knob screwed-in next to the correct voltage ?

IF THE NEON INDICATOR IS LIT, BUT THE FLASH DOESN'T GO OFF :

1) Check that the synchronizing cord is plugged in with the correct polarity.

2) Unplug the synchronizing cord. Push the OPEN FLASH push-button to see if the flash goes off. If it does, the trouble comes from the synchro-cord of the shutter. To check the synchro cord, unplug it from the shutter and short-circuit (with a metal object) the plug going normally to your shutter. If the flash goes off, the trouble is definitely in your shutter or vice-versa. We strongly recommend using the BALCAR synchro extensions (which in Europe can also be used as the AC line cord).

3) Is the lighthead plug plugged in completely with the blue side towards the outside and facing the blue rectangle on the control panel ? If not, the trigger coil has been burnt out by discharging the flash condensors through it. In this case, the coil must be replaced.

4) The flash tube may be damaged, defective, become hard to trigger or not pushed in completely. Push it in or replace it with another to see if the flash goes off correctly. If the flash tube has become difficult to trigger, it is easy to ascertain this simply by putting your flash unit on RAPID charge and pressing the "Open Flash" pushbutton every 3 seconds. If after a half dozen flashes, the flash does not go off each time, very probably the tube has become difficult to trigger. If you continue using this tube, you will have problems of misfiring. The flash tube should be changed. 90 % OF ALL BREAKDOWNS ARE DUE TO THIS PHENOMENA.

5) Try interchanging lightheads (to see if a trigger coil or cable is not defective).

IF THE UNIT FLASHES OFF CONTINUALLY :

1) Make sure that all of the AC cord contacts and all of the synchro contacts are perfect.

2) If several flashes have their synchro circuits linked together and flashing occurs, see Chapter "Synchronizing of several T-1005 units together".

3) If the flash unit is being used out of doors or in a humid place, isolate all metallic parts (flash generators, tripods, stands, etc... by placing a sheet of supple plastic materiel underneath them. Also preferably isolate yourself from the ground by standing on an unrolled sheet of plastic.

## THE FLASH TUBE

The color of the light from the Quartz flash tube FQ-2500 is almost identical with sunlight (5,500° K), (see spectrum in chapter "Special ultra-violet light filter shell"). It is therefore, perfect for use with "Daylight" type color films. However, with different emulsions, it may perhaps be necessary to use correction filters. Tests made by BALCAR show that (with color reversal emulsions) artificial-light types used with a correcting orange filter, invariably give inferior results compared with unfiltered Daylight color film, and are therefore, nor recommended.

With negative color films (EKTACOLOR, AGFACOLOR, etc...) excellent and constant results are to be had with film specially made for short duration exposures. They usually give less contrast than obtained with "long exposure" types and have improved color rendition.

The flash tube is not guaranteed because it can easily be broken.

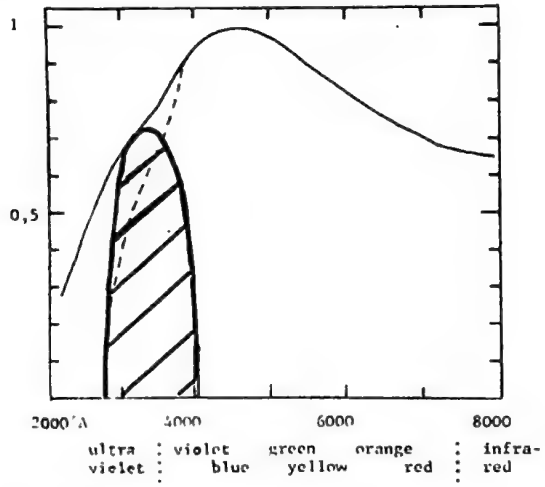
It may become hard or impossible to trigger off if the gas has been deteriorated by use. In this case, it is necessary to replace the flash tube (see above).

Excellent cooling of the flash tube is had thanks to the aerated pyrex shell (cage) protecting the tube. This shell can be removed for cleaning.

## SPECIAL ULTRA-VIOLET LIGHT FILTER SHELL

This deep purple colored shell completely filters all of the light leaving the Quartz flash tube. It is made of special glass based on the research done by Dr. WOOD. Practically all of the light transmitted by it from the Quartz flash tube fall between 3000°A and 4000°A. (see the curve below).

Bare Quartz tube : continuous line
Quartz tube with Pyrex shell : combination of dotted and continuous lines
Quartz tube with UV Filter Shell : shaded area.




Light output in relation to wavelength.

Rapid firing of the flash tube should be avoided since almost all of the visible light is absorbed, thus being transformed into heat and there is no aeration possible since the tube is 100 % enclosed.

This "Black light" has many interesting applications both in scientific and commercial photography, since many special effects can be had by photographying light "fluorescing" from the subject, rather than the color of the subject itself in white light.

Many times a better contrast (in both B + W photography as well as in color) is had by putting a yellow filter in front of the lens (i.e. K1). This will absorb any of the visible blue-violet light that can be seen when the flash goes off. Sometimes, a 2B filter is considered enough.

Tests with Polacolor film will give an adequate guide for both exposure and for filtering.

All sorts of fluorescent powders can be bought in specialized stores. Interesting fluorescent lingerie photos can be made simply by dipping the lingerie in modern detergent powders all of which contain fluorescent powders to make the products washed in them appear WHITER.

Remember that you are photographing visible fluorescent light. If you wished to photograph the ultra-violet light, special emulsions and quartz lenses would be needed.

## MAINTENANCE

It is best to switch on the flash unit once a month and to set off several flashes. This will keep the special high-quality electrolytical condensors properly formed.

## CARE AND HANDLING OF EQUIPMENT

1° Keep you equipment clean. DUST ON REFLECTORS ABSORBS AND DIFFUSES LIGHT. After use, remove the reflectors and replace the metal tube protector. This will prevent dust from falling on the tubes causing them to brown from the heat of the flash and the modelling lamps. (The metal tube protector can also be placed on the lighthead along with the reflector).

2° Turn on the modelling lamps only when needed to see what you are doing. Do not leave them on continually all day long. If your modelling lamps or flash tube blacken, change them to avoid their absorbing light.

## REFLECTORS

The T-1005A (F101) is delivered with 3 reflectors : R-50, R-100 and the WHITE UMBRELLA REFLECTOR. The R-100 has a double use :

1° It is an excellent wide angle reflector (70° angle - ASA)

2° Used in conjunction with the white umbrella reflector or another large white surface, it makes a very efficient bounce source. When using the white umbrella reflector, ALWAYS use the R-100 reflector (Ø 8 in.- 21 cm). The umbrella,made of VINYL-CHLORIDE,is washable. The outside is opaque to prevent stray light from coming through.

## THE R-25 REFLECTOR

This reflector gives from 4 to 5 times the amount of light obtained with the R-50 reflector, but of course, with a much smaller angle (ca. 20°). This reflector is so efficient optically that the modelling lamps are outside the focal point and because of this, they give a false indication as to the angle being lit. However, reflections and shadows in the center zone of the area being lit, are exact. When used with the translucent umbrella, this is the perfect light source for PORTRAITS and STILL LIVES. F-stops of f-45 and f-64 are easily obtained with 64 ASA color emulsions.

## PENCIL LIGHT

The "Pencil Light" is a special Lighthead of very small size, thus permitting it to be hidden inside Lampshades, Japanese lanterns, behind different objects, etc... It can also be used to replace a Ringlight simply by using 1 or more around your lens. It is often used in Enlargers and Lightboxes for duplicating color differencies. You can also place it inside existing Spotlights, and special lighting arrangements, or lightboxes used for lighting purposes, etc...

## PUTTING ON THE REFLECTORS

Reflectors R-50, R-100 and R-25 fit the lighthead in the same manner as the metal tube protector (Pl.2). However, it is necessary to turn the reflectors until the two slots fall opposit the two black knobs. Squeeze

the two knobs slightly together and push the reflector in firmly against the lighthead. Then screw tightly the knobs.

Once locked in place, our lightweight rotatable barndoors, can be attached to the reflector.

To use the white umbrella reflector, proceed as follows :

1° Open the umbrella slowly. (In cold weather, open very slowly as the plastic stiffens with the cold).

2° Pass the umbrella-stick through the hole in the lighthead just below the flashtube.

3° When the end of the umbrella-stick is flush with the back of the lighthead, tighten the knob on the underside of the lighthead. This will hold the umbrella in place.

FOR THE SOFTEST LIGHTING EFFECT AND THE MOST EFFICIENT USE OF THE UMBRELLA-REFLECTOR, PLACE IT AS CLOSE TO THE SUBJECT AS POSSIBLE.

THE TRANSLUCENT UMBRELLA is held in the same manner. For details about its use, please, consult the special chapter concerning it.

## FILTERING THE LIGHT FOR BLACK AND WHITE PHOTOGRAPHY

Normally, no filters are needed or used with electronic flash since its spectrum is almost identical with that of daylight (5.500°K). However, because of this, the light from a Xenon electronic flashtube contains much more blue than that given by an incandescent lamp. Therefore, when taking B + W portraits, cleaner skin tones may be had by using a warm filter such as the K2 (8) or 85B. When taking furniture shots, a warm tone filter also gives the wood a lighter, more pleasant quality, showing more details in the wood.

## GUIDE-NUMBERS IN FEET AND IN METERS

$$\text{Definition : } \frac{\text{Guide number}}{\text{Distance}} = \text{F-STOP}$$

NOTA : If you divide by feet, use the "Ft" guide-numbers and if you divide by meters, use the "M" guide-numbers.

APPROXIMATE GUIDE-NUMBERS IN FEET AND IN METERS

| Light source | 64 ASA | | | | | | 100 ASA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1200 J | | 600 J | | 300 J | | 1200 J | | 600 J | | 300 J | |
| | FT. | M. | FT. | M. | FT. | M. | FT. | M. | FT. | M. | FT. | M. |
| Bare tube | 110 | 37 | 80 | 27 | 62 | 21 | 138 | 46 | 100 | 24 | 78 | 26 |
| White umbrella + R-100 | 140 | 47 | 84 | 28 | 72 | 24 | 175 | 59 | 105 | 30 | 90 | 30 |
| R-100 | 280 | 93 | 184 | 61 | 150 | 50 | 350 | 116 | 230 | 63 | 188 | 63 |
| R-50 | 440 | 147 | 300 | 100 | 220 | 73 | 550 | 184 | 375 | 91 | 275 | 91 |
| R-25 | 900 | 300 | 640 | 213 | 450 | 150 | 1125 | 375 | 800 | 188 | 570 | 188 |
| SP-5 with FRESNEL | 220 | 73 | 160 | 53 | 124 | 41 | 275 | 91 | 200 | 67 | 155 | 52 |
| SP-5 with plane-convex | 200 | 67 | 140 | 47 | 113 | 38 | 250 | 84 | 175 | 48 | 141 | 48 |
| SP-5 with ELLIPTAR f-2.5 180mm | 110 | 37 | 80 | 27 | 62 | 21 | 138 | 46 | 100 | 26 | 78 | 26 |
| SP-5 with f-2.5 180mm lens + plane convex | 105 | 35 | 76 | 25 | 60 | 20 | 131 | 44 | 95 | 25 | 75 | 25 |

For 125 ASA : multiply the 64 ASA guide-number by 1.4
For 200 ASA : multiply the 100 ASA guide-number by 1.4

The guide-number for the : bare tube, R-50, R-100 and R-25 are based on the distance between the flash tube and the subject. The guide-number for the white umbrella-reflector is based on the distance between the umbrella and the subject.

Make tests to ascertain your correct guide-numbers. In most cases the guide-numbers with faster emulsions are not as high as the manufacturers would have you think. In most cases with negative emulsions the best quality negatives are to be had with a lower guide-numbers than which would be used for a positive emulsion of the same ASA rating.

ATTENTION : These guide-numbers are correct for an ordinary subject in a normal size and colored room, lit by a light coming from the direction of the camera. They are given only as a basis for tests to be run by each photographer. The black and white GUIDE-NUMBERS can vary greatly with the developers used.

The GUIDE-NUMBERS will be higher if :

1° The picture subject is light-colored,

2° The room is white and small.

They will be lower if :

1° The subject is dark-colored or very light-absorbant,

2° The room is big or dark,

3° The picture is being taken outdoors,

4° The light falls on the subject from the side.

ATTENTION : If several lightheads are used to light a subject and it is necessary to use the GUIDE-NUMBERS to find the correct F-STOP, remember that :

1° Backlights, etc... should not be counted at all.

2° If 2 lightheads light the subject, the amount of light (NOT THE GUIDE-NUMBER !) is doubled, ONLY if the 2 lightheads are grouped together and aimed at the same point. Otherwise, there is little less than double the amount of light.

3° Each time the amount of light is doubled, the GUIDE-NUMBER is increased a little less than 50 % (i.e. 100 becomes 140 for 2400 J. instead of 1200 J).

CHARACTERISTICS OF THE DIFFERENT REFLECTORS

| Light source | Approx. area of the light source in cm2 | Shadow sharpness | Contrast in a small white room | Contrast in a large dark room | Coverage Ang. | Coverage Ø lit | Reflect. factor based on R-50 |
|---|---|---|---|---|---|---|---|
| Bare tube | 7.5 cm2 | Extremely sharp (1) | soft | very high | 360° | | 1/10 |
| R-100 | 200 cm2 | very sharp (2) | soft | high | 70° | 2D | 1/2.5 |
| R-50 | 700 cm2 | fairly sharp (3) | very high | very high | 40° | 1D | 1/1 |
| R-25 | 1500 cm2 | soft (3) | very high | very high | 20° | 1/2D | 5 |
| R-100 + white umbrella | 7000 cm2 | very soft (4) | very soft | soft | 160° | | 1/5 |
| SP-5 with Fresnel | 150 cm2 | very sharp (2) | high | high | 50° to 1° | | |

(1) similar to a point light source
(2) similar to a 500 W. spot
(3) similar to a 5000 W. spot
(4) similar to a 1 M2 white panel (10 sq. Ft.)

At the above angles the amount of light is 50 % or more of the maximum amount of light in the center of the beam (all measurements being made at a constant distance), and the diameter lit is in terms of the distance of the light source from the subject.

With the BALCAR T-1005A (F101) it is possible to do practically any lighting effect desired. It is helpful to remember that :

1° A SHADOW will be SHARPER, the SMALLER the light source APPEARS TO BE when seen from the subject and vice-versa. Therefore, by choosing your light source (BARE TUBE, WHITE UMBRELLA-REFLECTOR, R-100, R-50) and by varying the distance between it and your subject you can control the sharpness of the shadows to any desired degree.

2° The LIGHTING CONTRAST is simply the ratio between the quantity of light coming from the main light or lights and the fill-in lights. Therefore, by bouncing in more or less diffused light into shadows, you can control the contrast to any desired amount.

3° Other EFFECTS can be gotten by using our BARNDOORS which we manufacture for all our reflectors, by diffusers, by reflecting spots of lights by hand

mirrors (flat or concave), by colored filters, by large white panels and by the translucent umbrella, etc... OR BY USING THE SP-5 SPOT-PROJECTOR.

## THE TRANSLUCENT UMBRELLA

This translucent umbrella diffuser is used with all the reflectors R-25, R-50 and R-100.

The light is projected through this translucent umbrella and a semi-direct light source is thus obtained, of softer quality than with the reflector by itself, and this semi-direct light has the advantage of having more contrast than that which can be had with the WHITE umbrella.

Since the angle lit by the reflector is increased, there is less concentration of light than that which is had by using the reflector directly on the subject. However, there is far more light than with the WHITE umbrella. The amount of course, varies depending on which reflector you are using.

By varying the distance between the translucent umbrella and the reflector you can change : the angle lit ; the contrast ; the quantity of light falling on the subject ; and the shadow sharpness.

This translucent umbrella diffuser is most useful since it fills in the gap between the rather harsh light of the direct reflectors and the often too soft, bounce light obtained with the WHITE umbrella, (or with the white panels, etc...).

Approximately, 1 stop less light is had with all reflectors when using the translucent umbrella. (see page 33 for additional information).

## HOW TO CREATE "ARTIFICIAL DAYLIGHT"

Place several WHITE UMBRELLA-REFLECTORS around the subject, or with the R-100, bounce light off other large white surfaces, to create the SHADOW-LESS SKYLIGHT EFFECT. Then aim one R-100 directly on the subject to give the effect of the sun.

If you have the 4800 JOULES LIGHTHEAD, simply use it without a reflector as the SUNLIGHT SOURCE. The white walls of the studio should throw back enough diffused light to act as a fill-in or skylight. Some studios have even painted their walls slightly blue so as to give the shadows a bluish cast.

## HOW TO GET VERY DARK BUT SOFT-EDGED SHADOWS

1) Use a big Ø light source (i.e. several white umbrellas, white panels, etc...) in order to have diffused shadow definition.

2) Cover the walls, ceiling and floor of your studio with black in order to avoid light bouncing back into your shadows, thus lighting them, and consequently reducing your contrast.

## THE ELLIPTICA SP-5 SPOT-PROJECTOR

This interesting, new accessory used in the hands of original, creative photographers offers possibilities limited only by one's imagination.

It is more than just a spotlight or just a projector. It offers :

1) Variable angle (50° to 1°).
2) Variable shape and size.
3) Variable contrast.
4) Projection of color transparencies, cut-outs, etc.
5) Extremely high efficiency.

It is extremely SIMPLE TO USE if you understand its working principles.

How it works.

The ELLIPTICA SP-5 PROJECTOR and OPTICAL SPOTLIGHT concentrates almost 100% the light output on the optical system, thus assuring very high efficiency (GN 220 (in ft) for 64 ASA).

Since it is really a projector, it is possible to project any desired shape of light simply by placing a corresponding mask in the negative carrier. Variable angle lighting is accomplished by opening and closing a stainless steel iris diaphragm, thus varying the angle lit without varying the amount of light, therefore avoiding problems of light balancing.

### IMPORTANT POINTS TO REMEMBER WHEN USING THE ELLIPTICA SP-5 SPOT-PROJECTOR

1) Slide the 92mm Ø lighthead within the 7" Ø (R-18cm) reflector to the position marked "SP-5" and lock it in place.

2) Place the optical element you wish to use IN THE FRONT CARRIER. The clear Fresnel lens gives 50 % more light than the plane-convex element but with more diffusion and less definition. Special high quality lenses exist for projecting transparencies. (Only lenses with large diameter optical elements are efficient).

When the stainless steel iris is placed in the front carrier, it acts in the same way as an iris does on the lens of your camera (i.e. it increases sharpness and depth of focus, while reducing : halo, diffusion and the quantity of light, etc...). It can also be used to control shadow sharpness since you can effectively control the Ø of your light source this way, thereby increasing shadow sharpness as you "stop down".

3) Things to be projected (cut-outs, magnetic mask, iris, transparencies, one or several designs painted on glass with dyes, etc...) are placed in the REAR CARRIER (near the light source.)

4) Stopping down the rear diaphragm will thus reduce the angle or area lit to a small point and vice versa (50° to 1°). For other shaped lit areas, use the VARIABLE MAGNETIC MASK or place cut-outs in the negative carrier. Preferably, use white paper with a metal foil backing to avoid burning the cut-outs. Since most of the infra-red goes through the dyes of your color transparencies, these will not normally be damaged by the heat (unless you trigger off a great number of flashes very rapidly).

It is possible to eliminate the halo around the projected image of the iris,

WITHOUT LOSING LIGHT, simply by placing one iris in the rearmost slot of the rear slotted carrier and the second iris in the forwardmost slot of the REAR slotted CARRIER (instead of in the front slotted carrier). When the diameter of the two coincide, you will see that the halo is controlled at will, without losing light (as would be the case were you to place the second iris in the front carrier).

5) VARIABLE DIFFUSION can be had by using the metal-rimmed, mobile ground-glass in front of the thing being projected and by varying the distance of this diffuser from the object (i.e. iris, mask, transparency, etc...). For maximum softness, place it in the last slot of the front carrier rather than in the rear carrier. (Up to 4 different objects can be placed in either the front or rear slotted carriers).

6) Focusing is done by using the knob on the rear of the SPOT-PROJECTOR. The closest distance you can sharply focus at, is 1 meter (40").

7) The Tilt-Pan Head can be placed either above or below the SPOT-PROJECTOR depending on whether it is to be placed on a stand or hung from a "BOOM".

8) For the maximum amount of light always : a) use the Fresnel lens ; and b) place the SP-5 as close to the subject as possible. In light ouput the SP-5 is about the equivalent of the R-100 or the white umbrella. Don't ask it to compete with 3 or 4 R-50 reflectors !

If extra power is needed with your SP-5 SPOT-PROJECTOR, ask our importer to give you information about the special 2400 J (w/s) flash unit, we make especially for this use.

ATTENTION !!! Be careful never to trigger the flash with your eye or hand inside the SP-5. Due to the tremendous concentration of energy, serious burns could be caused instantaneously.

## USING THE SP-5 FOR MAKING PHOTO-MONTAGES WITH OR WITHOUT A SUBJECT IN FRONT OF IT

While it is usually complicated, long and costly to combine two or three transparencies together to make a photo-montage : with the SP-5, this becomes very simple since the SP-5 is a true projector.

Simply place behind a high definition, translucent screen (KODATRACE will do) two or three SP-5 projectors each with the different transparency within it and combine them together (overlapping or not) - using the power selector of each flash, the iris of the projection lens, or a neutral density filter to balance them.

It is best to place the projectors as close together along the optical axis and to use a black background for your transparencies (if possible).

It is also possible to project from the front onto white paper, but distortion is had, since the images must be projected from the side.

## PROJECTING COLOR TRANSPARENCIES

LENS : For maximum quality and efficiency, preferably use lenses recommended by BALCAR S.A./PARIS. If you wish to try out lenses you already own, use only lenses of appropriate focal length and having a large diameter rear element with a large effective aperture.

TRANSPARENCIES : It is also recommended to use very low density transparencies, (as light as possible,) especially made for projection purposes. In choosing transparencies, try to stay within the following density readings : .25 to .30 for the whites, and a maximum of 1.7 for the darkest portions. Otherwise, your transparencies will absorb too much light, and too little light will reach the screen. Your transparencies will normally not be damaged by the flash since their dyes absorb very little infra-red rays.

SCREEN : While the SP-5 Spot-Projector can easily be adapted to a front projection system using a semi-reflecting mirror and an auto-collimating screen, this method is not recommended for general use since it is full of pitfalls and cannot be used with hand held cameras.

Projections can also be made from the front or side onto white background paper, but this again is not recommended because of : 1) low efficiency, 2) tending of the white screen to be "fogged" by any ambiant light 3) Distortion caused by a non-parallelism of the projector and the screen.

Consistently, best results have been had with special translucent REAR projection screens, either "folding" the light rays by a mirror or not - to reduce the projection distance by half. (see sketch).

AMBIANT LIGHT : With all projection systems, trouble is encountered by ambiant lighting. It is always advisable to avoid excess light falling on the screen.

Less trouble is encountered with translucent, Rear Projection screens than with others, if one or more of the following suggestions are heeded :

1) Use "gobos", "barndoors" or big size opaque panels to avoid as much as possible, ambiant light falling on the screen.

2) If your screen is of good quality, relatively little trouble is caused by light falling on the screen itself. But, what should be avoided is that the light falling on the screen should be reflected back through the screen towards the camera lens. This is easily avoided by making everything black behind the screen so that any light coming through the screen, is absorbed and not reflected back onto the screen.

3) Some photographers place a black gauze (muslin) at about 40 to 50cm (16 to 20 inches) in front of the screen. This prevents practically all light coming from the side, falling on the screen, while absorbing a minimum amount of the light coming through the center portion of the screen. With this system, white umbrella lighting can be used on the subject.

4) Often, normal POLAROID filters are used on the light sources and the camera lens.

5) Sometimes a pencil light is placed next to the lens and used as a ringlight and a special circular Polarization filter is placed in front of this and the camera lens. Normally the subject is in the central position of the screen and avoids any bright reflections from that portion of the screen, and the Polarization effect avoids any wash-out in general of the screen.

6) In most cases, photographers simply take care when lighting the subject to avoid desaturation problems. This is easily done by using one or more SP-5 SPOT-PROJECTORS to light the subject.

THE SCREEN : Ideally, it should be of suitable size, be very dark or black in reflection density, have a mat surface, be supple, highly efficient in light transmission, concentrate all the light from the rear projector onto the camera lens, and evenly light all the screen when seen from the camera lens.

We have yet to find this ideal screen, but many photographers have gotten excellent results with many different types of screens.

FINDING THE EXPOSURE : The simplest, quickest and most accurate way is to make a POLACOLOR test. It is difficult to make calculations by GUIDE NUMBERS, or by Flashmeters, etc... since there are many variations in the amount of light absorbed by different transparencies, screens, etc...

USING A MIRROR TO CUT THE PROJECTION DISTANCE IN HALF, (see sketch)

A normal mirror may be used without any deterioration of quality. The mirror should measure a bit more than 1/2 the length and width of your screen.

Care should be taken in aligning the mirror. It should be placed along the optical axis of your camera lens and the center of the screen. And the center of the mirror should be placed at the same height as your camera lens.

The projector should be placed as close to the screen as possible. This will permit you to focus the projector with the screen right in front of your eyes.

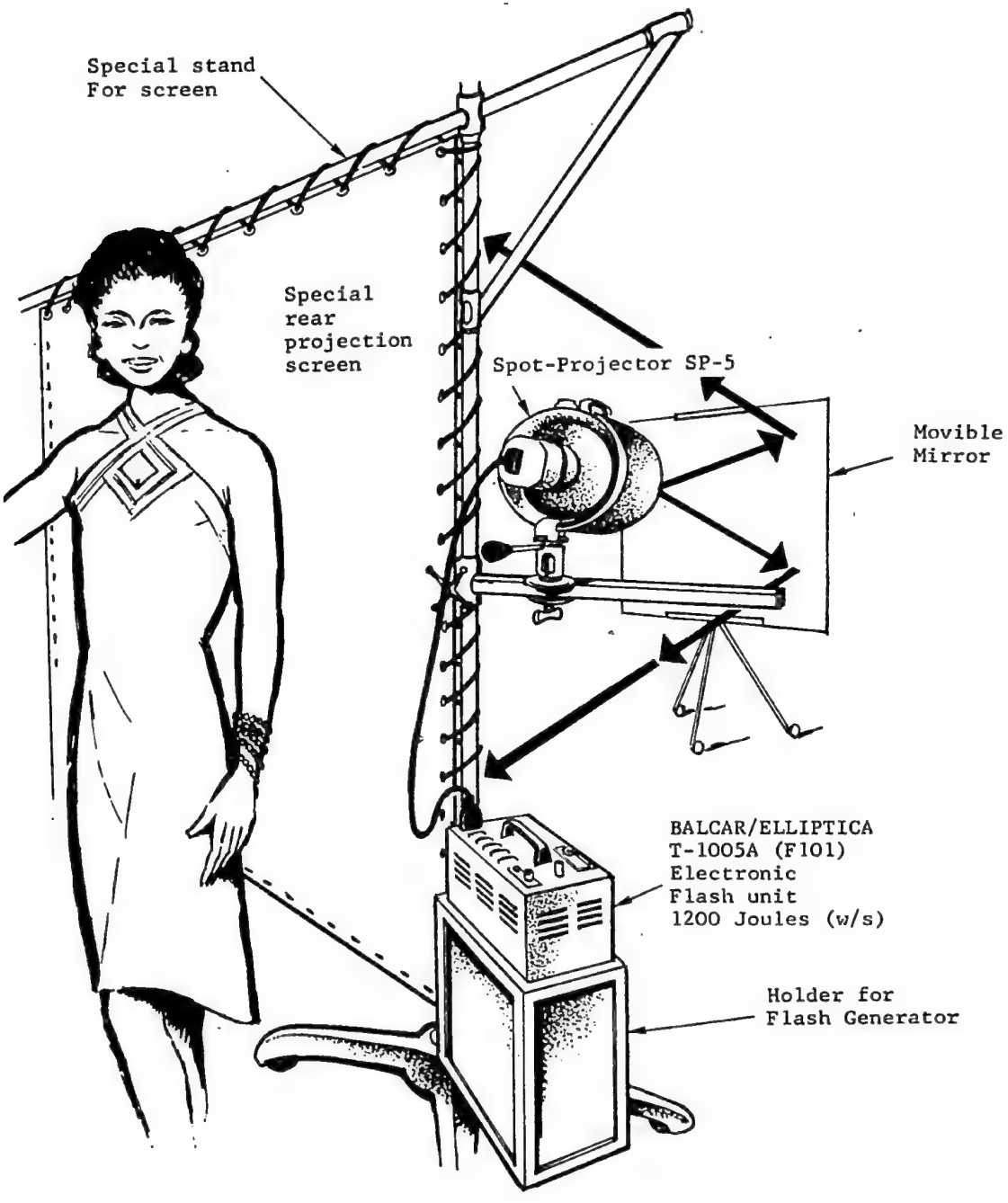
The projector height should be the same as the middle of the screen, corresponding also with the height of your camera lens, and the height of the center of the mirror.

The mirror, projector, screen, and camera lens should all be perpendicular to the ground. However, the mirror will be turned more or less, towards the projector, depending on what distance the mirror is from the screen. To vary the projection distance and the degree of enlargement, the mirror is simply moved towards or away from the screen.

When doing small projections or when using several SP-5 Spot-Projectors, it is best to remove the mirror and project directly onto the screen.

**ELLIPTICA**

BACKGROUND PROJECTION



## PORTRAIT LIGHTING

While the P-6 portrait flash unit is made especially for PORTRAIT PHOTOGRAPHY, the P-6 is very limited in its power (750 w/s max. for 6 125 w/s lightheads). And many photographers prefer to buy an equipment which can be used for both commercial photography and portrait use. This requires 4 lightheads and 2400 J. (w/s).

We find that the following equipment admirably fulfills this need, and gives you excellent value for your money.

| | |
|---|---|
| 101a | 2 T-1005A complete electronic flashes (QUARTZ) |
| 102a | 2 extra lightheads complete (QUARTZ) |
| 106 | 2 5m (15 ft) lighthead extension cables |
| 108 | 2 7,50m (25 ft) synchro extension cords |
| 110 | 1 male/male synchro adaptor |
| 112 | 2 translucent umbrella diffusers |
| 104 | 1 extra flashtube QUARTZ FQ-2500 |
| 113 | 1 R-25 reflector |
| 105a | 6 120 V. 40 W. rare gas modelling lamps |
| 090 | 1 ELLIPTICA Flashmeter |
| 184 | 2 2 element barndoors for R-100 |
| | also preferably with : |
| 250 | 1 SP-5 Spot-Projector |
| 101s | 1 T-1005A flash unit (generator only for SPOT) |
| 255 | 2 75 W. 120 V. frosted modelling lamps (SPOT) |
| 254 | 1 circular QUARTZ flastube FOR SPOT-PROJECTOR |

### PLACING THE LIGHTS FOR COLOR PORTRAITS AT f-22 WITH 100 ASA EKTACOLOR "s" NEGATIVE FILM

FOR PORTRAITS WITH A NORMALLY LIT BACKGROUND :

1) MAIN LIGHT : an R-50 or R-100 with a translucent umbrella in front of it (or use the BARNDOORS with a translucent diffuser) at 6 to 8 ft. (1.8m to 2m) from the subject and about 6 ft. or 1.8m high. Your ELLIPTICA Flashmeter should give a reading of f-22.

2) FILL-IN-LIGHT : one R-100 reflector (without Barndoors) bouncing onto a white umbrella at about - ft. (1.8m) from the subject and at about 5 1/2ft (1.6m) high. The Flashmeter reading should be between f 11 and f 16.

3) BACKGROUND LIGHT : one R-100 with diffuser and barndoors (to avoid spilling light) laying on the floor behind the subject and placed about 3ft. (90cm) from the background, aimed upward at it, and lighting it with a soft, variable amount of light. The Flashmeter reading at the shoulder level of the subject should be about f 16.

4) HAIR LIGHT : one R-100 with barndoors and diffuser, placed on a boom about 3ft. (1m) above and slightly behind the subject. Your Flashmeter should read about f 32.

### FOR PORTRAITS WITH A BLACK BACKGROUND

Use a black background, preferably BLACK VELVET, and place your main, fill-in and hair lights in the same positions as noted above. However, remove the background light and use it as a BACKLIGHT usually placed on

the same side as your mainlight and at about the same height as your subject. Its Flashmeter reading should be about f 32.

Remember that thanks to our special voltage-stabilisation system, absolutely constant, high quality color negatives are obtained.

## FINDING THE CORRECT EXPOSURE WITH A FLASHMETER

The quickest and most precise way of finding the correct f-stop is to use the ELLIPTICA Flashmeter. This revolutionary, new exposure meter reads directly the light coming from the flash tube and gives you a direct reading in f-stops.

No wires are necessary since the meter is battery powered and the flash of light triggers the circuitry without the use of synchro wires. The needle is held electronically in place with no need of holding a push-hold pushbutton.

There are 3 ASA scales going from 3 to 3200 ASA, 3 f-stop scales : f-4 to f-64 ; and one scale reading in % of light.

Simplified, space-age solid circuitry assures trouble-free, long life.

Both reflected light and incident light readings can be made.

For the convenience of clients having older-type AC mains operated FLASHMETERS, a special 4-Pole meter plug is installed on the control panel next to the lighthead plugs.

Two of the poles are for the Synchro "X" circuits and the other two are for powering the meter. Depending on what country you are in, the AC mains voltage supplied can either be 110 V. or 220 V. See your local importer for exact information.

## FINDING THE CORRECT F-STOP BY USING THE MODELLING LIGHTS AND YOUR EXPOSURE METER

This system is NOT recommended since the light ouput of the FLASH Unit is stabilised, while that of the modelling lamps is NOT. Also, any ambiant light will automatically give you a false indication. Only an exposure reading taken with a good Flashmeter is valid.

The reflectors of the T-1005A are specially designed (and the modelling lights placed) so that, with most of the reflectors, the light from the modelling lights covers the SAME ANGLE and gives the same SHADOW EFFECT and lights the subject in the SAME PROPORTION in the center zone as the light from the flash tube. It is, therefore, possible to use them to arrange precisely your lighting effects and then with your normal exposure meter, find the correct F-STOP. (However, in practice few photographers do this since Flashmeters are now generally available).

To do this :

1) Set your exposure meter for the true film speed (for electronic flash) of the film you are using.

2) Use your meter as you normally would, were you taking the picture with only the modelling lights. BE SURE THAT NO OTHER LIGHT FALLS ON THE

SUBJECT, otherwise your exposure meter may give a false indication.

3) When using an INCIDENT light exposure meter, the correct F-STOP is the one across from 20 seconds for 1200 Joules ; across from 10 seconds for 600 Joules ; and across from 5 seconds for 300 Joules.

4) When using an exposure meter basing its reading on REFLECTED light take the reading of the light reflected from a piece of WHITE MATTE paper. In this case, for 1200 J. the F-STOP is the one across from 4 seconds ; across from 2 seconds for 600 J. ; and across from 1 second for 300 J.

IMPORTANT : THE ABOVE INFORMATION IS GIVEN ONLY AS A BASIS. Each photographer should make his own test, as there are many possible differences in :

1) The speed of films,

2) The correcting filters needed,

3) The F-STOP indicated by different exposure meters,

4) The light transmission of different lenses,

5) The personal tastes of different photographers.

If you find that you are over-exposing, take the F-STOP across from a larger number of seconds and VICE-VERSA.

## USING THE T-1005A AS A FILL-IN LIGHT IN DAYLIGHT

Place one or several lightheads in front of the subject. In order to have a more natural light effect, it is better to use several white umbrella reflectors rather than one R-50 or R-100.

Since daylight makes it impossible to use your regular exposure meter to find the correct F-STOP for the FLASH, use the GUIDE-NUMBER (see chapter GUIDE-NUMBERS), and proceed as follows :

1) Measure the distance between the FLASH and the subject. Divide this distance into the Guide-Number to find the correct F-STOP, or

2) Take a Flashmeter reading.

3) Use your exposure meter to find the exposure for the scene by daylight, without taking into account any correction for the shadows. Choose the shutter-speed across from the F-STOP found above in Step 1 or 2.

4) It is generally agreed that making a Polaroid test shot is the quickest and surest way of balancing the fill-in light and daylight.

NOTE : To increase the contrast, use a smaller F-STOP and a slower shutter speed and VICE-VERSA.

If only the background is lit by daylight, it is possible to make this background lighter or darker without changing the exposure of the subject lit by FLASH simply by using the F-STOP found above in Step 1 while varying your exposure duration (shutter speed).

## GASOLINE (PETROL)-DRIVEN MOTOR GENERATOR

If you wish to use your flashes where there is no 110 or 220 V. AC power, we advise you to use our small portable motor-generator furnishing 1000 watts in 220 V. 60 Hz. current. It is driven by a 2 horsepower, 75 cm3 Sachs motor, using about one quart of 4 % mixture per hour.

Our German-made motor generator is EXTREMELY SILENT since one muffler is used on the carberator air intake and two mufflers are used on the exhaust.

Up to 6 or 8 T-1005A FLASHES (14,400 JOULES) without the modelling lights on, or 5 or 6 T-1005A FLASHES with their modelling lights on, will be charged in about 10 seconds. ALL THE CHARGING TIME SELECTROS SHOULD BE PUT ON SLOW CHARGE.

## GIANT SIZE 40" Ø (1m) REFLECTOR SYSTEM

Combining at the same time very high efficiency with very soft-edged shadows, these new reflectors, make all home-made "light boxes" outmoded.

A true parabolique reflector, with very shallow depth, efficiently throws the light where you want it, and a unique louver and Barndoor system permits you to light up precisely what you want.

These 1m Ø reflectors may be stacked or placed side by side to make up a "WALL OF LIGHT".

Diffusion can be added to control the angle and quality of the light.

### SIZE OF GENERATOR

32 cm x 23 cm x 16 cm
12.6 in x 9 in x 6.2 in

### APPROXIMATE WEIGHT

| | Pounds | Metric |
|---|---|---|
| GENERATOR | 26 | 12 kg |
| MONOPODE | 1 | 500 g |
| AC POWER CORD | 1/2 | 250 g |
| LIGHTHEAD WITH CABLE | 2 | 1 kg |
| UMBRELLA (Ø 40" or 1.01m) | 1.1/2 | 700 g |
| R-100 | 1/3 | 150 g |
| R-50 | 7/8 | 400 g |

## LIST OF SUGGESTIONS OF EQUIPMENT FOR MANY DIFFERENT TYPES OF STUDIOS

As you can see, the BALCAR/ELLIPTICA electronic flash equipment is so versatile and has so many accessories, that few photographers really know exactly what accessories, etc they will be needing. So, based on our experience of equiping thousands of studios, we offer the following list as a guide to what you should buy. Feel free to eliminate any accessories you are certain not to need. Special equipment such as that used in STROBOSCOPIC Shots or UV Shots are not included although most photographers buy them for experimenting.

### BALCAR/ELLIPTICA ELECTRONIC FLASH EQUIPMENT - TYPICAL INSTALLATIONS

| code | FOR PORTRAIT PHOTOGRAPHERS AND THOSE USING 35mm & 2'/4"sq (6x6cm) CAMERAS |
|---|---|
| 101a | 2 T-1005A complete electronic flashes (QUARTZ) |
| 102a | 2 extra lightheads complete (QUARTZ) |
| 106 | 2 5m (15ft) lighthead extension cables |
| 108 | 2 7,50m (25ft) synchro extension cords |
| 110 | 1 male/male synchro adaptor |
| 112 | 2 translucent umbrella diffusers |
| 104 | 1 extra flashtube QUARTZ FQ 2500 |
| 113 | 1 R-25 reflector |
| 105a | 6 120 V. 40 W. rare gas modelling lamps |
| 090 | 1 ELLIPTICA Flashmeter |
| 184 | 2 2 element barndoors for R-100 |
| | also preferably with : |
| 250 | 1 SP-5 Spot-Projector |
| 101s | 1 T-1005A flash unit (generator only for SPOT) |
| 255 | 2 75 W. 120 V. frosted modelling lamps (SPOT) |
| 254 | 1 circular QUARTZ flashtube FOR SPOT-PROJECTOR |

| code | MINI | AVER. | MAXI | FOR COMMERCIAL PHOTOGRAPHERS |
|---|---|---|---|---|
| 101a | 4 | 6 | 8 | T-1005A complete elctronic flashes (QUARTZ) |
| 250 | 2 | 3 | 5 | SP-5 Spot-Projector |
| 103 | 1 | 1 | 2 | 4.800 J. multitube lighthead |
| 104c | 4 | 4 | 8 | Quartz flashtubes |
| 137 | 1 | 1 | 2 | pencil lightheads |
| 112 | 2 | 3 | 4 | translucent umbrellas |
| 113 | 1 | 2 | 2 | R-25 reflectors |
| 255 | 4 | 6 | 10 | 75 W. 120 V. frosted modelling lamps (SPOT) |
| 105a | 10 | 15 | 20 | 40 W. 120 V. rare gas modelling lamps |
| 106 | 1 | 1 | 2 | 15 ft (5m) lighthead cables |
| 107 | 1 | 1 | 2 | 30 ft (10m) lighthead cables |
| 108a | 4 | 6 | 8 | 25 ft (7,50m) synchro extension cords |
| 110 | 3 | 5 | 7 | male/male synchro adaptors |
| 138 | 1 | 1 | 2 | remote contro photocell slave |
| 254 | 1 | 1 | 1 | circular QUARTZ flashtube (SPOT) |
| 090 | 1 | 1 | 1 | ELLIPTICA Flashmeter |
| 184 | 4 | 6 | 8 | 2 element barndoors for R-100 |
| 185 | 4 | 6 | 8 | 2 element barndoors for R-50 |

### PRICE LIST

| | | Price |
|---|---|---|
| 101a | T-1005A complete (QUARTZ) | |
| 102a | extra lighthead complete with QUARTZ Flashtube | |
| 103 | 4.800 J. multitube lighthead (less tubes and reflectors) | |
| 104c | QUARTZ Flashtube FQ-2500 | |
| 105a | 40 W. 120 V. modelling lamps (high efficiency, rare gas type) | |
| 101s | T-1005A Flash generator only | |

| | | Price |
|---|---|---|
| 106 | 15ft (5m) lighthead cable | |
| 107 | 30ft (10m) lighthead cable | |
| 108a | 25ft (7,50m) synchro extension cord | |
| 110 | male/male synchro adaptor | |
| 112 | translucent umbrella (1m Ø = 40 inches) | |
| 113 | R-25 reflector | |
| 137 | pencil lighthead | |
| 138 | remote control photocell slave | |
| 250 | SP-5 Spot-Projector | |
| 254 | circular QUARTZ flashtube (SPOT) | |
| 255 | 75 W. 120 V. frosted modelling lamp (SPOT) | |
| 184 | 2 element barndoors for R-100 | |
| 185 | 2 element barndoors for R-50 | |
| 090 | ELLIPTICA Flashmeter | |

## CONCERNING DIFFUSION

There are three methods of diffusing light : 1) By diffusing the light source, 2) By making the surface of the reflector in such a way that light is reflected over a greater angle than it would be, were the reflector highly polished and 3) By placing a diffuser in front of the reflector.

Each of the above system gives a different shadow effect. With the BALCAR/ELLIPTICA flashes, the two latter systems are used, and when their differences are understood, you will understand why THE TRANSLUCENT UMBRELLA is used in most cases whenever reflectors throw light directly on the subject (see page 22).

On page 21 it is shown that since the bare flash tube is very small in size, it gives a very sharp shadow similar to that given by a point light source. When using a reflector along with the bare tube, you effectively now have TWO light sources - a) the bare tube + b) the light reflected from the reflector. (In certain cases you can even have have 2 shadows due to this). The shadow definition of the light from bare flash tube and from that of the reflector are different, since the diameter of the Bare tube and the Reflector are different. You will, therefore, always have a SHARP SHADOW caused by the light from the bare tube plus a more diffused shadow caused by the light from the reflector. There is only one way to diffuse BOTH of these shadows and to make them homogene. This can only be done by placing a diffuser in front of the reflector thus mixing up and diffusing ALL the light leaving the reflector.

Great care must be taken in choosing the diffusing materiel since too much diffusion will cause too much light loss, and also annul the reflector characteristics.

The TRANSLUCENT UMBRELLA is especially made to absorb about only 1 stop of light and is also completely neutral in color. And in reading over page 22 again, you'll see the other advantages it has.

All of our rotatable BARNDOORS are made with slots for holding both round and square diffusers. Of course, no variation in diffusion is possible since the diffuser stays at a constant distance from the reflector.

## NOTES

## IMPORTERS

AUSTRIA - VIENNA VIII - E. REICHERT & CO., Bennogasse 24 - Tel. 42.23.19

HOLLAND - AMSTERDAM - CAPI LUX, Nassaukade 361 - Tel. 12.82.23
AMSTERDAM 5 - N.V. TRANSCONTINENTA, Wibautstraat 212
Tel. (020) 94.92.31

DENMARK - COPENHAGEN - S.E. SVENDSEN, Rygårds Allé 131 - Tel. 29.38.10

FINLAND - HELSINKI 51 - S. V. O., Lemuntie 9 - Tel. 71.18.11

GERMANY - 8 MUNICH 27 - DR. GARTNER + CO., R. Strauss Str. 49
Tel. (08.11-) 48.59.20

ITALY - MILAN - MAFER S.A.S. DIM D'ATTI, Via G.B. Brocchi 22
Tel. 29.35.78

PORTUGAL - LISBON - J.C. ALVAREZ LDA., 205 rua Augusta 207 - Tel. 3.50.34

SPAIN - BARCELONA - PABLO A. WEHRLI S.A., Calle José Bertrand 3
Tel. 230.98.04
MADRID - PABLO A. WEHRLI S.A., Plaza Vasquez de Mella 6
Tel. 231.81.47

SWEDEN - STOCKHOLM - MOLANDER & SON, Brännkyrkagatan 64 -
Tel. Väl 69.01.00

MEXICO - MEXICO D.F. - KODAK MEXICANA LTD., Calzada de Tlalpan 2980
Admon de Correos 68 - Tel. 49-35-60

CENTRAL AMERICA - PANAMA - KODAK PANAMA LTD., Ave. 7 Central 16A-02
Tel. 3-9440

VENEZUELA - CARACAS - MICRON C.A., Avenida Urdaneta/Veroes a Ibarras
Tel. 81.24.51

## RENTAL SERVICE

In most of the above places, BALCAR/ELLIPTICA flashes may be rented. It is preferable to contact each place well ahead of time in order to make arrangements.

Approximate rental charges per day per complete flash unit are : $ 15, or FF 60, or 3 guineas.